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Report on Polaris Mine

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REPORT ON POLARIS MINE.

Polaris mine is located in Beaverhead County, Montana, about forty miles west of Dillon, and forty-five miles north-west of Red Rock, Montana, on the west slope of Bald Mountain, in Billings Gulch.

The Group consists of seven claims, four of which are patented, owned by The Silver Fissure Mine Co.

IMPROVEMENTS.

The improvements consist of three bunk houses, one boarding house, six cabins, one office building, one stable, an old mill and a water system. The bunk houses and cabins are all in good condition, and are sufficient for the accommodations of 40 or 50 men.

The old mill is a building about 40 x 85 feet, the frame of which is good, although the siding has been partially removed.

There is a gravity water system in good condition, with sufficient pressure for fire protection, and all the cabins are plumbed, thus furnishing conveniences enjoyed by few mining camps.

TIMBER.

There is an abundance of timber in the gulch for lumber and mining purposes. It consists mostly of fir and white pine, many trees being three or four feet in diameter. Mr. J. A. Carmichael, a good millwright man, who has had a great deal of experience in the lumber business, states that there is a half million feet of good saw timber within the radius of one mile of the mine. There is almost an inexhaustible supply of nice straight mining timber of almost any size desired, within easy reach.

WATER.

Billings Creek flows down the gulch in which the mine is located. It is the source of the water supply for the camp, and

has a fall of about five percent, thus rendering it possible, by going a little way up the gulch, and flumeing, to attain almost any pressure desired, as the hills on the sides of the canyon are very steep.

Billings Creek was measured at low water last August by Dr. J.S.C.Wells, Prof. of Chemistry at Columbia University, and at present Supterintendent of the Silver Fissure Co., and found to carry about 225 gallons per minute. This supply, Dr. Wells believes sufficient for the proposed smelter.

WATER POWER.

Lake Creek is in Lake Gulch, about one mile north of Billings Gulch, and carries about 245 cu. ft. per minute. The creek was measured by myself with a weir, on the 18th day of last January. The creek at that time was probably very nearly low water, as it had been for some time previous quite cold, and no snow melting. A survey, made by myself, shows that by going up this creek two miles and 1600 feet, this creek can be flumed over the crest of the mountain between the two gulches and secure a fall of 700 feet, allowing 1/2 inch to the rod of grade for the flume. There will then be required about 3300 feet of iron pipe to conduct it to the plant. The cost of installing is estimated at $10,000.00, and will give about 190 effective H.P. The details of this proposed power system is best shown and explained by the profile of the ground, and my separate report on same, a copy of each of which is attached to this report.

TRANSPORTATION.

This has always been a very serious drawback to the mine. Heretofore, the ore has been hailed out in wagons forty miles to a Railroad. This company believes they have solved this problem by treating the ore on the ground by smelting, and hauling the coke in with traction engines.

Going over the road with Mr. Todd, the engineer represent-

ing the Traction Engine Company, we decided that we could get a connection to the Railroad at a point about four miles north of Red Rock, and by cutting off west of Bannack, we could reduce the distance to 38 miles, and at the same time get a very good grade all the way.

The original estimate of Mr. Todd on the cost of the road was $5000.00. There has been to date about $1900.00 worth of work done, the larger part of which was under my own supervision, and I estimate that we have a little more than one-third of the work done, so that I believe that Mr. Todd's estimate is not far from correct.

In staking out the road, I was able to get a three per cent grade all the way, coming toward the mine, until I reached the mouth of Billings Gulch. From there up to the mine, about one and one half miles, it requires a five per cent.

The road all the way is in a sort of volcanic ash, and I believe will pack and become very hard after being used a short time, and the grade an exceptionally good one for a mountain road.

Mr. Todd's report will give a better idea of what can be expected from the Traction problem, as I myself have had no experience whatever with same.

GEOLOGY.

The formation is limestone, crossed by a granite intrusion trending north-east and south-west. This intrusion is several miles wide and Polaris mine is located on the north-west contact. The outcrop is near the top of the mountain, on the south side of Billings Creek. The strike of the vein is about North 65º East. The dip of the vein varies greatly. From the surface down to the 200 ft. level, it dips to the north about 65º. From the 200 ft. to the 260 ft. level, it is nearly vertical. On the 315 ft. level the vein is dipping to the south 45º. This dip has only been

revealed since the present company took hold of the property, and is the cause of the former company abandoning the property, believing that the vein struck on the main tunnel level to be the main vein. If the dip on the 315 ft. level (marked 300 ft. on map) continues down to the main tunnel level, it will cut same 401 feet south of vein mentioned above. This is a very important discovery on the part of the present owners.

The vein has a limestone hanging wall, and quartz for the foot wall, there being a quartz and spar filling between the ore and the granite which is probably the foot wall proper.

The vein I believe to be a true fissure vein.

ORE.

The ore is nearly a pure quartz, carrying on an average of about 80 per cent silica, about 3 1/2 per cent lime, and 4 per cent iron, and about 1/4 per cent copper. The values consist almost entirely of silver, carrying only from 40 to 80 ¢ in gold per ton. The silver values vary from an ounce to 1542 oz. per ton, as shown on the assay map attached, which I made entirely myself. I sampled the mine thoroughly, taking 356 samples, assayed all of them for gold, and silver, and run about 60 of them for iron, lime and silica. The gold was so small in quantity that I could not weigh it on the balances I had at command, so that after parting,. if none of them showed gold in large enough quantity to weigh by themselves, I put about ten of them together, weighed, and took an average. I took about sixty samples, which represented such ore as we expected to extract and run for iron, lime, and silica, with results as mentioned above.

The values and location as well, of the ore, is best shown by the assay map attached.

It is difficult, however, to sample this mine with the idea of determining the amount and value of the ore to be extracted, as nearly all above the 260 ft. level has been extracted, while all

below same is virgin ground, and save the one place on the 315 ft. level, has not been opened at all. The 450 ft. level as shown on the map is not on the vein proper. Suffice it to say that the values on the 315 ft. level are good, and the ore body large and strong, and there is every reason to believe they go down.

A letter from J. S. Meade, who formerly worked this mine and who is now in California, states that on the 50 ft. level there are about 2000 tons of ore, already broken, that will average about 40 oz. per ton, which would not pay for handling at the time mined, but with the smelter on the ground, it will. This level is caved, and I am unable to examine same.

The ore shoot, as is characteristic of the limestone formation, widens out in places to great bodies of ore, and at other places narrows down to only a little stringer.

The ore shoot as opened up above, is about 250 feet long but that it continues further west is shown by the Montezuma claim which has a good body of ore. See map.

TREATMENT.

Dr. J.S.C.Wells, of whom I have mentioned above, has worked out the treatment process, and this subject is best dealt with in his report. Suffice it to say that it is a smelting process, and that both the lime and iron fluxes are here on the ground. The lime comes from the hanging wall out of the mine. The iron from a magnetite mine just over the hill and situated about one mile from the smelter site. The iron ore carried about $1.50 in gold, and I believe that limestone can be secured carrying 4 or 5 oz. in silver. Dr. Wells estimates the cost of smelting at between $6.00 and $7.00 per ton.

PRODUCTION.

There are smelter returns from past shipments of the mine which aggregate $782,469.23. These are in the possession of B. F. White, of Dillon. Besides these, it is claimed by the former owners that there was about $100,000.00 shipped of which they have no record.

RECOMMENDATIONS.

I recommend that a cross cut be driven from the main tunnel to the foot of the old raise so that the ore can be brought out without winding around the old tunnel, which will save a great deal of time and energy in removing ore and waste.

I recommend that a new raise be made in the main tunnel so as to intersect the ore body about half way between the main tunnel, and the different levels, so ore can be taken out through this raise, as it will be impossible to handle sufficient ore through the old raise to supply the smelter.

I recommend that the main tunnel be driven straight ahead to intersect the ledge.

This will give, I believe, ample stopeing ground to supply the smelter.

All these recommendations are marked on the accompaning map.

Respectfully submitted,

S. R. Moore

Mining Engineer.